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VERIFICATION OF TRANSLATION

The undersigned hereby certifies that I am conversant in both the Japanese and English languages, that I have prepared the attached English translation of Japanese Patent Application Serial No. 2000-340437, filed November 8, 2000, and that the English translation is a true, faithful and accurate translation of Japanese Patent Application Serial No. 2000-340437.

I further declare that all statements made of my own knowledge are true and that all statements made on information and belief are with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 USC § 1001, and that such false statements may jeopardize the validity of the application or any patent issuing therefrom.

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This is to certify that the annexed is a true copy of the following application as filed with this Office.

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[Name of Article]	Drawing 1
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[NAME OF DOCUMENT] Specification

[TITLE OF THE INVENTION] PLASMA DISPLAY MODULE WITH A POWER SOURCE

[CLAIMS]

5 [Claim 1] A plasma display module with a power source comprising: a plasma display module which has a plasma display panel and a driving circuit which drives said plasma display panel; and a first power source circuit which supplies a power source to said driving circuit,

10 wherein said first power source circuit inputs an AC power source, a first control signal, and a second control signal and outputs a control power source, a first power source, and a second power source group to drive said plasma display module.

15 [Claim 2] A plasma display module with a power source according to claim 1,

 wherein said first power source circuit

 outputs said control power source when said AC power source is inputted to said first power source circuit,

20 outputs said first power source when said first control signal is inputted to said first power source circuit, and

 outputs said second power source group to drive said plasma display module when said second control signal is
25 inputted to said first power source circuit.

 [Claim 3] A plasma display module with a power source according to claim 2,

 wherein said first power source circuit

starts up a low power source voltage in said second power source group driving said plasma display module, earlier than a group of high power source voltages.

[Claim 4] A plasma display module with a power source
5 according to claim 2,

wherein said first power source circuit
shuts down a group of high power source voltages in said second power source group driving said plasma display module, earlier than a low power source voltage.

10 [DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[Field of the Invention]

The present invention relates to an improvement of a plasma display module driving power source.

15 [0002]

[Prior Art]

Fig. 4 is a block diagram showing the conventional plasma display device. A first power source circuit to drive a plasma display module and a second power source
20 circuit to drive an interface board are united to constitute a third power source circuit 8.

[0003]

A power source voltage necessary to drive the interface board which is designed by a plasma display device
25 manufacturer depends on the IC which has been customized for each manufacturer, and the power source voltage varies from one manufacturer to another (for example, 3.3V, 5V, 7V, or 12V and so on) and has not been standardized.

Accordingly, in a case where the plasma display device manufacturer develops a power source, the plasma display device manufacture newly developed an integrated power source circuit to drive both the interface board and the
5 plasma display module.

[0004]

[Problem to be solved by the invention]

However, in the method of described above, as a power source to drive a plasma display module, a high-voltage and
10 high-capacity power source is required. Therefore, in order to develop a power source circuit, there is a problem in that a great amount of costs and man-hours become necessary.

[0005]

The present invention was made under the background
15 above. It is an object of the present invention to provide a plasma display module with the power source for which the development costs and man-hours for development of the power source circuit by the plasma display manufacturer can be reduced, which comprises a power source circuit of a high-
20 voltage and high-capacity power source circuit to drive the plasma display module, and when the plasma display device manufacturer develops the plasma display device, this can be carried out by only designing the interface board which A/D converts the analogue image input signal and outputs the
25 digital image signal and the power source circuit for driving the interface board.

[0006]

[Means to solve the Problem]

According to the present invention of claim 1, there is provided a plasma display module with a power source comprising: a plasma display module which has a plasma display panel and a driving circuit which drives said plasma display panel; and a first power source circuit which
5 supplies a power source to said driving circuit,

wherein said first power source circuit

inputs an AC power source, a first control signal, and a second control signal and outputs a control power source,
10 a first power source, and a second power source group to drive said plasma display module.

[0007]

According to the present invention of claim 2, there is provided a plasma display module with a power source
15 according to claim 1,

wherein said first power source circuit

outputs said control power source when said AC power source is inputted to said first power source circuit,

outputs said first power source when said first
20 control signal is inputted to said first power source circuit, and

outputs said second power source group to drive said plasma display module when said second control signal is inputted to said first power source circuit.

25 [0008]

According to the present invention of claim 3, there is provided a plasma display module with a power source according to claim 2,

wherein said first power source circuit
starts up a low power source voltage in said second
power source group driving said plasma display module,
earlier than a group of high power source voltages.

5 [0009]

According to the present invention of claim 4, there
is provided a plasma display module with a power source
according to claim 2,

wherein said first power source circuit
10 shuts down a group of high power source voltages in
said second power source group driving said plasma display
module, earlier than a low power source voltage.

[0010]

A plasma display module with a power source according
15 to the present invention, comprises a power source circuit
of a high-voltage and a high-capacity to drive a plasma
display module, accordingly when a plasma display device
manufacturer develops a plasma display device, this can be
carried out by only designing an interface board which A/D
20 converts an analogue image input signal and outputs a
digital image signal and a power source circuit for driving
the interface board. Accordingly, the development costs and
man-hours for development of the power source circuit can be
reduced.

25 [0011]

[DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS]

Hereinafter, a preferred embodiment of the present
invention will be described in detail with reference to the

attached drawings. Fig. 1 is a block diagram showing a plasma display module with a power source according to the present invention. A plasma display module 1 comprises a plasma display panel 2 and a driving circuit 3 to drive said
5 plasma display panel 2.

A first power source circuit 4 to drive the plasma display module 1 inputs of an AC power source, a first control signal PSS, and a second control signal PSM, and outputs a control power source Vstb, a first power source
10 Vaux, and a second power source group Vcc (5v power source), Vd (data power source, for example, 60V), and Vs (maintenance power source, for example, 160V) which is supplied to said driving circuit 3.

[0012]

15 It is an object of the present invention to provide a plasma display module wherein a third power source circuit 8 of a plasma display device using the plasma display module 1 shown in Fig 4 into a first power source circuit 4 to drive said plasma display module 1 and a second power source
20 circuit 6 to drive said interface board 7, as showing in Fig 2, and said first power source circuit 4 inputs and outputs a power source and a control signal which is required by said interface board 7, said second power source circuit 6, and said plasma display module 1.

25 [0013]

An explanation of operation of said embodiment above constructed is easy to understand at a plasma display device using the plasma display module with a power source

according to the present invention, therefore it will be described with a block diagram of the plasma display device according to the embodiment of the present invention shown in Fig 2.

5 In Fig 2, the plasma display device comprises a plasma display module 5 with a power source having the plasma display module 1 and the first power source circuit 4, and the second power source circuit 6, and the interface board 7.

[0014]

10 The first control signal PSS and the second control signal PSM are connected from said interface board 7 to said first power source circuit 4, the control power source Vstb is connected from said first power source circuit 4 to said interface board 7, the first power source Vaux is connected
15 from said first power source 4 to said second power source 6, the second power source group Vc(5V), Vd(60V), and Vs(160V) is connected from said first power source circuit 4 to the driving circuit 3, the third power source Vx through Vz (3.3V, 5v, 7v and so on) is connected from said second power
20 source circuit to said interface board 7 , a digital image signal is connected form said interface board 7 to said driving circuit 3.

And, the AC power source is connected to said first power source 4, an analog image signal is connected to said
25 interface board 7.

[0015]

At first, a description will be given of operations when starting up the power source, referring to Fig 3.

When the AC power source is inputted at time t_1 , the control power source V_{stb} becomes high level and reaches a stand-by state.

When the device is turned on at time t_2 , a control
5 portion, which is not shown, of the interface board 7 starts to operate and the first control signal PSS becomes high level.

The first power source circuit 4 makes the first power source V_{aux} high level, when the first control signal PSS is
10 inputted, in addition, the second power source circuit 6 makes the third power source group V_x through V_z high level, to drive the interface board 7 when the first power source V_{aux} is inputted.

[0016]

15 And the interface board 7 begins to supply the digital image signal to driving circuit 3 and simultaneously makes the second control signal PSM high level.

The first power source circuit 4 makes, when the second control signal PSM is received, the low power source
20 voltage V_{cc} of the second power source group high level and then makes the high power source voltages V_d and V_s high level, to let the plasma display be displayed.

If the high power source voltage is started up earlier than the low power source voltage, a high voltage circuit
25 may have floating gate levels and a penetration current may flow, causing damage to the high voltage circuit. For the prevention of the damage, in the present embodiment, the high power source voltages V_d and V_s are made high level

after the low power source voltage Vcc is made high level.

[0017]

Thereafter, a description will be given of operations when shutting down the power source.

5 When the power source of the plasma display is turned off at time t3, the interface board 7 stops outputting the digital image signal and simultaneously makes the second control signal PSM low level.

10 When the second control signal PSM becomes low level, the first power source circuit 4 makes the second power source group Vd and Vs low level and then makes the second power source group Vcc low level.

15 Thereafter, after an elapse of a predetermined time (for example, 200msec), the interface board 7 makes the first control signal PSS low level.

[0018]

20 When the first control signal PSS becomes low level, the first power source circuit 4 makes the first source voltage Vaux low level. When the first power source voltage Vaux becomes low level, the second power source circuit 6 makes the third power source group Vx through Vz low level, and reaches a stand-by state.

25 When the AC power source is disconnected at time t4, the first power source circuit 4 makes the control power source Vstb low level and the stand-by state is cancelled.

[0019]

The mentioned above, operation of the embodiments of the present invention has been described in detail with

reference to the attached drawings, the present invention is not limited to said embodiments. The present invention can be modified within the scope of the present invention.

[0020]

5 [EFFECT OF THE INVENTION]

As mentioned above, according to the present invention, since a power source circuit of a plasma display device is divided into a first power source circuit to drive a plasma display module and a second power source circuit to drive
10 said interface board, a plasma display module manufacturer can put the first power source circuit in a plasma display module and supply. Therefore, a plasma display device manufacturer can develop a plasma display only by designing an interface board and a second power source circuit for
15 driving the interface board. Accordingly, costs and man-hours for development of the power source circuit can be reduced.

[0021]

In addition, since the first power source circuit is
20 delivered after being integrated into the plasma display module, the plasma display device manufacturer can omit adjustment of the each voltage of the second power source group, also therein, an effect which man-hours can be reduced is obtained

25 [BRIEF DESCRIPTION OF THE DRAWINGS]

[Fig. 1] Fig. 1 is a block diagram showing a construction of a plasma display module with a power source according to an embodiment of the present invention.

[Fig. 2] Fig. 2 is a block diagram showing a plasma display device using a plasma display module according to an embodiment of the present invention.

[Fig. 3] Fig. 3 is a waveform diagram explaining an
5 action of a plasma display device shown in Fig. 2

[Fig. 4] Fig. 4 is a block diagram showing a plasma display device using a plasma display module of a prior art.

[Description of the numerals]

- 1: plasma display module
- 10 2: plasma display panel
- 3: driving circuit (driving circuit which drive a plasma display panel)
- 4: first power source circuit (power source circuit which drive a plasma display module)
- 15 5: plasma display module with a power source
- 6: second power source circuit (power source circuit which drive an interface board)
- 7: interface board (an interface board which A/D converts an analogue image input signal and outputs a digital image
- 20 signal to a driving circuit 3)
- 8: third power source circuit (power source circuit which drives a plasma display device: first power source circuit + second power source circuit)
- PSS: first control signal (signal which controls starting up
- 25 and down the second power source circuit)
- PSM: second control signal (signal which controls starting up and down the first power source circuit)
- Vstb: control power source (power source which makes the

plasma display device to reach a stand-by state.)

Vaux: first power source (power source which supplies a power source to a plasma display module)

Vcc, Vd, Vs: second power source group (power source group
5 which drives a plasma display module)

Vcc: low power source voltage

Vd: (data power source)

Vs: (maintenance power source): high power source voltage

Vx-Vz: third power source group (power source group which
10 drives an interface board)

FIG. 1

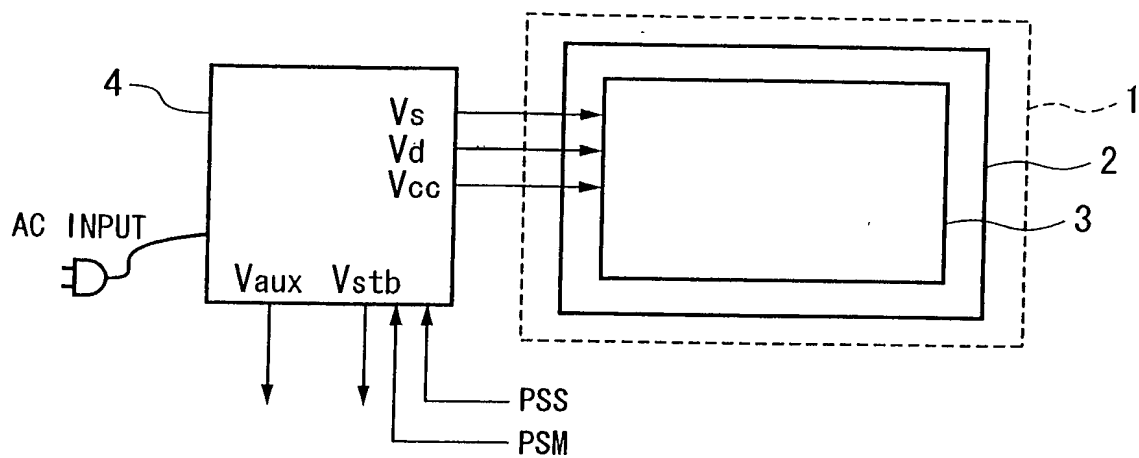


FIG. 2

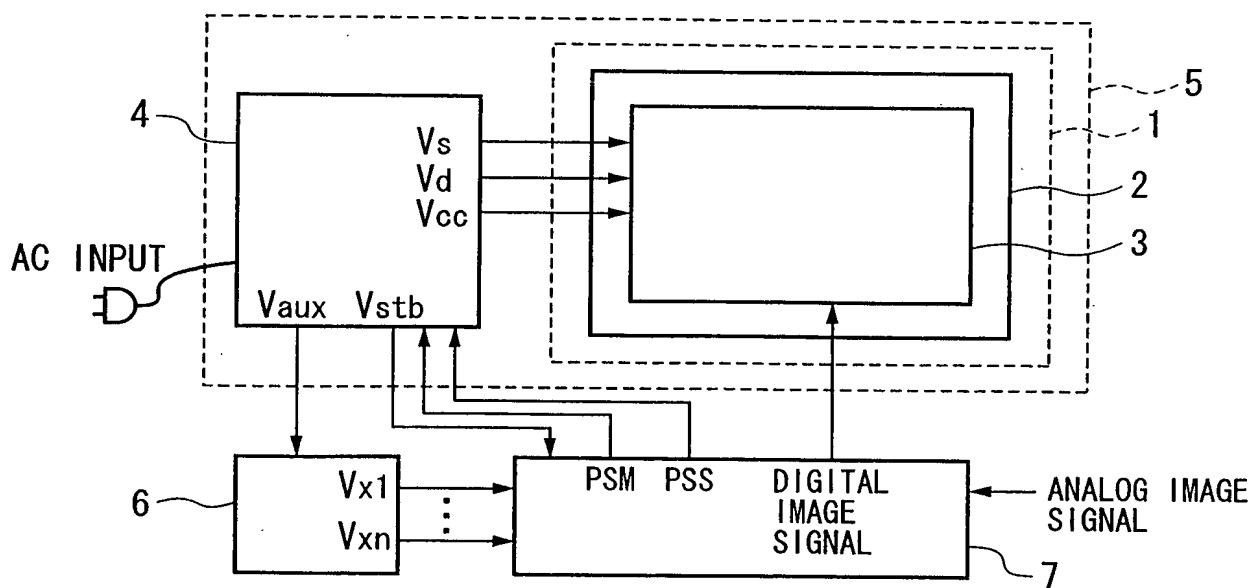


FIG. 3

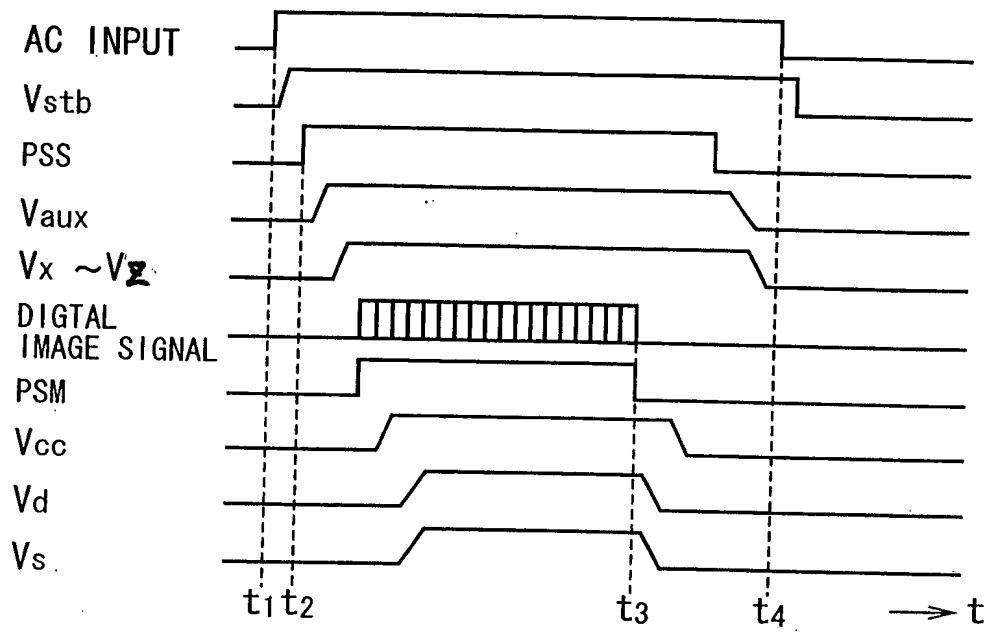
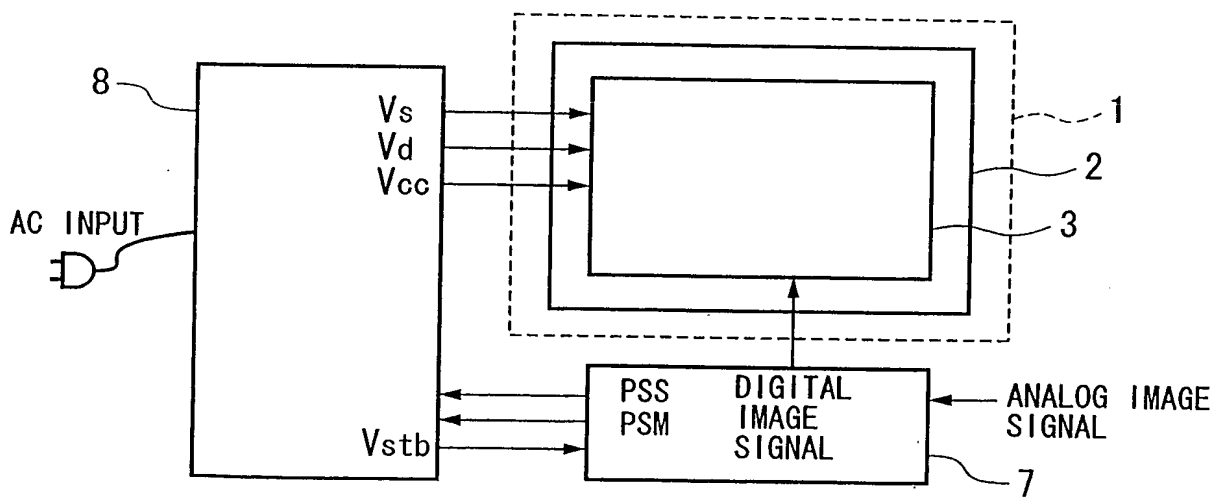


FIG. 4



[NAME OF DOCUMENT] Abstract

[Abstract]

[Object] It is an object of the present invention to provide a plasma display module with a power source in which
5 the development costs and the man-hours for development of a power source circuit can be reduced.

[Means for solving the problem]

A plasma display module with a power source has a plasma display module having a plasma display panel and a
10 driving circuit which drives said plasma display panel, and a first power source circuit which supplies a power source to said driving circuit. Said first power source circuit inputs an AC power source, a first control signal, a second control signal and outputs a control power source, a first
15 power source, a second power source group to drive said plasma display module. Said first power source circuit outputs said control power source when said AC power source is inputted to said first power source circuit, outputs said first power source when said first control signal is
20 inputted, outputs said second power source group to drive said plasma display module when said second control signal is inputted.

[Selected Drawings] Fig.1